WHAT IS CLAIMED IS:

1. A slider for supporting transducer elements for a data storage system comprising:

a rigid member including opposed leading and trailing edges and opposed upper and lower surfaces, the lower surface including a raised bearing, a trailing edge surface being adapted to support a transducer element;

landing pads extending from the raised bearing and adapted to define a contact interface with a disc surface; and

at least one pressure relief trench formed in the raised bearing proximate to a contact interface position between the trailing edge of the slider and disc surface, the trench being sized to reduce capillary pressure of the meniscus along the disc surface.

2. The slider of claim 1 wherein the slider includes a center rail and the center rail includes a pressure relief trench.

3. The slider of claim 1 including a transversely aligned pressure relief trench.

4. The slider of claim 3 wherein the transversely aligned pressure relief trench is opened at opposed ends thereof to form a through channel.

5. The slider of claim 1 including a longitudinally aligned pressure relief trench.

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capillary surface), via capillary pressure. The lubricant film is dragged so that the effect of the meniscus expands, while the attractive force between lubricant molecules and the solid surface, which is quantitatively represented by the disjoining pressure of the lubricant film, is overcome by the driving force of the capillary pressure of the meniscus. The magnitude meniscus force F_m and stiction for the slider is proportional to the area of the meniscus. In particular stiction force F_s (in grams-force gf) may be estimated as follows:

$$F_s \approx 0.0005A$$

where:

A is the area of the meniscus in micron^2.

For example, every 2,000 μm^2 of meniscus creates 1gf of stiction. Thus, in the embodiment of the slider 72 illustrated in FIGS. 3-4, the center rail 94 is approximately 70,000 μm^2 and thus if half the center rail is flooded an estimated stiction force is approximately 17.5 gf. The increase stiction force as illustrated above affects operation of the disc drive.

As the lubricant film is thinned, it is more and more difficult for a meniscus to draw lubricant from its surrounding area to spread. Eventually, a (quasi) equilibrium state is reached where the disjoining pressure of the film equals the capillary pressure of the meniscus as follows:

$$\frac{A_H}{6\pi d^3} - \frac{\gamma}{R_e}$$

where:

A_H is the Hamaker constant

γ - is surface tension of the lubricant;

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6. The slider of claim 1 including a sloped pressure relief trench.

7. The slider of claim 1 wherein the slider includes a plurality of spaced pressure relief trenches.

8. The slider of claim 1 wherein the slider includes opposed side rails and the side rails include a pressure relief trench.

9. The slider of claim 5 wherein the longitudinally aligned pressure relief trench includes an opened end.

10. The slider of claim 1 wherein the trench includes a depth dimension sized so that separation of the slider and disc at the trench during contact of the slider with the disc surface is equal to or greater than $2R_e$ to balance capillary pressure and disjoining pressure of a lubricant fluid on the disc surface.

11. The slider of claim 1 wherein the trench is sized to provide a slider-disc interface in the toe-dipping regime.

12. A slider for supporting transducer elements for a data storage system comprising:

a rigid member including opposed leading and trailing edges and opposed upper and lower surfaces, the lower surface including raised bearing surfaces, the trailing edge being

adapted to support a transducer element;

landing pads extending from a bearing surface and adapted to define a contact interface with a disc surface; and

pressure relief means proximate to a contact interface position between the trailing edge of the slider and disc surface to reduce capillary pressure of the meniscus to limit area of the meniscus.

13. The slider of claim 12 wherein the pressure relief means includes at least one trench formed in a bearing surface and extending below a bearing surface.

14. The slider of claim 12 wherein the trench includes a depth dimension sized so that separation of the slider and disc at the trench during contact of the slider with the disc surface is equal to or greater than $2R_e$ to balance capillary pressure and disjoining pressure of a lubricant fluid on the disc surface.

15. The slider of claim 12 wherein the trench is sized to provide a slider-disc interface in the toe-dipping regime.

16. The slider of claim 12 including a transversely aligned trench.

17. The slider of claim 12 including a longitudinally aligned trench.

18. The slider of claim 12 including a sloped trench.

19. The slider of claim 12 wherein the slider includes opposed side rails and the side rails include a trench.

20. The slider of claim 12 wherein the slider includes a center rail and the center rail includes a trench.